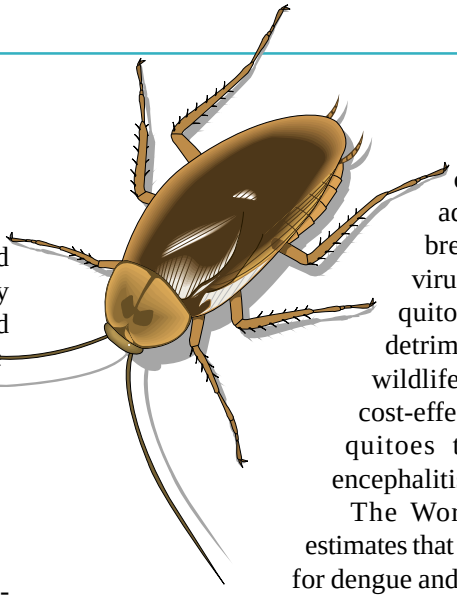
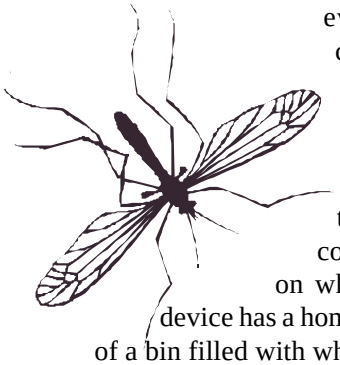
From Awareness to Knowledge to Solutions



May is Lyme Disease Awareness Month. Insects and arthropods transmit viruses and bacterial agents that seriously threaten livestock, lessen the value of crops and products, and pose health risks to people. Some of these agents, like the one that causes Lyme disease, can make us chronically ill. Awareness of such problems can often get people thinking about prevention and solutions.

In the 19th century, USDA researchers discovered that mosquitoes, ticks, flies, and midges spread disease from animal to animal. Now, in the 21st century, our researchers are still studying the relationships between animal hosts, insect and arthropod vectors, and disease agents.

Nearly 60 years ago, a memorandum of understanding between USDA and the Department of Defense launched research programs on insects and insect vectors of diseases like malaria. From this relationship, DEET—a broad-spectrum repellant—was developed to protect overseas military personnel from disease. Next, when the military needed evaluations of DDT and an array of compounds called insecticides, a long-term relationship was born that continues to this day.



A patented device developed by ARS researchers in Kerrville, Texas, is the basis for a 5-year USDA project to control ticks—vectors of Lyme disease—on white-tailed deer in the Northeast. The device has a homey name—the "four-poster." It consists of a bin filled with whole-kernel corn. On the four corners of the bin are paint rollers, which hold "one of the safest acaricides we could find for our experimental trials," according to one of its inventors. As a deer feeds on the corn in the bin, it rubs its head and neck against the paint rollers soaked in acaricide. The four-poster offers the management alternative of controlling ticks instead of controlling deer or spraying chemicals.

A pesticide to kill ticks on white-tailed deer is in the registration process. Once registration is approved, a subsidiary company of the American Lyme Disease Foundation is poised to make and sell the ARS four-poster. (See "Out of the Lyme-Light," on page 4.)

There are many examples of how ARS has applied its resources to finding alternatives to chemical pesticides. Biological control of insects is an effective way to reduce infectious diseases transmitted by mosquitoes. ARS researchers in Gainesville, Florida, discovered a natural baculovirus capable of killing mosquito larvae. A special cocktail holding the virus is added to water in the insects' breeding places. This baculovirus is highly specific for mosquitoes and isn't known to be detrimental to people, plants, or wildlife. It may lead to safer, more cost-effective ways to control mosquitoes that transmit St. Louis encephalitis and West Nile virus.

The World Health Organization estimates that 2.5 billion people are at risk for dengue and dengue hemorrhagic fever viruses. These diseases are transmitted by the yellowfever mosquito, *Aedes aegypti*. These risk estimates may be reduced thanks to a protozoan biological control agent, *Edhazardia aedis*, that infects and kills the mosquito. ARS and Argentine researchers are releasing *E. aedis* to battle mosquitoes in Argentina.

Finding out what attracts mosquitoes will help researchers find ways to control them. Many countries, particularly underdeveloped ones, need better methods for detection and population monitoring in areas where the risk of disease transmission by mosquitoes is high. Attractants in the form of nontoxic olfactory baits make traps work better; that is, they capture more mosquitoes in less time.

Trapping and monitoring insects can also reduce reliance on pesticides in populated areas. ARS and Yale University researchers are collaborating on a trapping project to vacuum mosquitoes from the air in large metropolitan areas. Some day, insect traps will be so fine-tuned they'll be more effective than spraying chemical pesticides.

Linda McGraw
ARS Information Staff
Peoria, Illinois